

CLEAN VERSION OF ALL PENDING CLAIMS

9. A method for operating a fixed bed reactor for reacting a feedstock in which the feedstock is contacted with a fixed bed of catalytic material contained in said reactor said fixed bed of catalytic material having a top and bottom layer, and wherein during operating of said fixed bed reactor, there is a pressure drop across said top layer of said fixed bed of catalytic material and wherein the pressure drop across said top layer of said fixed bed of catalytic material increases during reaction of said feedstock due to fouling of said top layer of said fixed bed of catalytic material, the method comprising:

(a) placing a bypass apparatus within said fixed catalyst bed in substantial alignment with the flow of said feedstock, said bypass apparatus comprising,

a cage member comprising a first elongated hollow member having a top wall, side walls and a bottom wall, said cage member having openings therein, and

a second hollow elongated member for bypassing an increasing amount of said feedstock through said second hollow elongated member into said cage as said top layer of said fixed bed fouls, said second hollow elongated member being disposed within said cage member and protruding through said top wall of said cage member and wherein said second hollow elongated member extends above said fixed catalyst bed through said cage member, said second hollow elongated member being sized to regulate the flow of said feedstock into said cage, said cage having a substantially larger cross-section than said second hollow elongated member to effectively reduce the exit velocity of the bypass flow from said cage into said bottom cage of said fixed catalyst bed,

CLEAN VERSION OF ALL PENDING CLAIMS (continued)

23 (b) introducing said feedstock into said fixed bed of catalytic material,
wherein a majority of said feedstock will flow through said top layer of said fixed bed
of catalytic material, and

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(c) as said top layer of said fixed bed of catalytic material fouds, bypassing
an increasing amount of said feedstock to said bottom layer of said fixed bed of
28 catalytic material.

10. The method of claim 9 wherein said hydrocarbon feed is selected from
the group consisting of liquid feed, vapor feed, and mixtures thereof.

11. The method of claim 9 wherein said feedstock is selected from the
group consisting of hydrocarbon feedstocks, chemical feedstocks, and mixtures thereof.

sub E4
DS 12. A method for extending an operating life of a fixed catalyst bed reactor,
the method comprising:

providing a reactor comprising at least one fixed catalyst bed;

partitioning the fixed catalyst bed into a top layer and a bottom layer by

5 placing a bypass apparatus within said fixed catalyst bed in substantial alignment with
the flow of said feedstock, said bypass apparatus comprising,

a cage member comprising a first elongated hollow member having a
top wall, side walls and a bottom wall, said cage member having
openings therein, and

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CLEAN VERSION OF ALL PENDING CLAIMS (continued)

10 a second hollow elongated member for bypassing an increasing amount of said feedstock through said second hollow elongated member into said cage as said top layer of said fixed bed fouls, said second hollow elongated member being disposed within said cage member and protruding through said top wall of said cage member and wherein said second hollow elongated member extends above said fixed catalyst bed through said cage member, said second hollow elongated member being sized to regulate the flow of said feedstock into said cage, said cage having a substantially larger cross-section than said second hollow elongated member to effectively reduce the exit velocity of the bypass flow from said cage into said bottom cage of said fixed catalyst bed,

15 introducing a feedstock into the fixed catalyst bed and as said top layer fouls, 13 bypassing an increasing amount of the feedstock to the bottom unfouled layer.

sub E5 14. The method of claim 12 wherein said second hollow elongated member is a tubular member having a diameter from about 0.25 to about 12 inches.

15 15. The method of claim 12 wherein said cage member is a tubular member having a diameter of about 3 to about 20 inches.

16. The method of claim 12 wherein said second hollow elongated member has a pressure drop of about 5 to about 50 times greater than that of said fixed catalyst bed when said fixed catalyst bed is a fresh catalyst bed.

17. The method of claim 12 further comprising a separation device disposed above said second hollow elongated member.

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18. The method of claim 12 wherein said separation device is selected from the group consisting of caps, centrifugal separators and cyclones.

19. The method of claim 12 wherein said fixed catalyst bed contains packing material for distributing particulates passing through said bypass apparatus.

20. The method of claim 19 wherein said packing material is selected from the group consisting of catalyst particles, alumina balls, inert particles, inert packing and mixtures thereof.